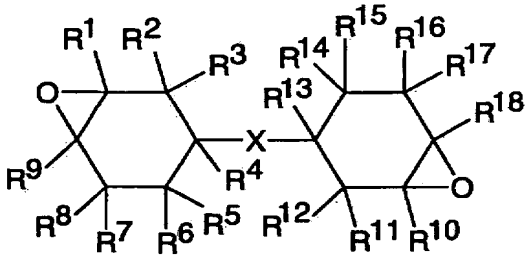
Claims

1. A high-purity alicyclic epoxy compound represented by the following general formula (I):



(I)

(wherein X is a divalent group selected from the group consisting of an oxygen atom, a sulfur atom, -SO-, $-SO_2-$, $-CH_2-$, $-C(CH_3)_2-$, $-CBr_2-$, $-C(CBr_3)_2-$, and $-C(CF_3)_2-$; R^1 to R^{18} each may be identical or different from each other and are a hydrogen atom, a halogen atom, a hydrocarbon group that may contain an oxygen atom or halogen atom, or an alkoxy group that may have a substituent),

in which the concentration of high-molecular-weight components having an elution time shorter than that of the alicyclic epoxy compound represented by the general formula (I) in detection by a gel permeation chromatography (hereinafter, GPC) is 5.5% or less with respect to the sum total of all of detected peak areas in terms of the peak area ratio per elution time.

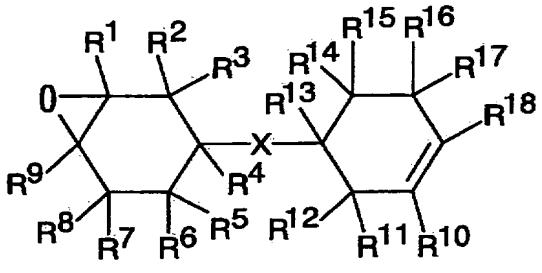
2. The high-purity alicyclic epoxy compound according to claim 1,

in which the concentration of impurities having a retention time shorter than that of the alicyclic epoxy compound represented

by the above general formula (I) in detection by gas chromatography is 19.5% or less with respect to the sum total of all of detected peak areas in terms of the peak area ratio per retention time.

3. The high-purity alicyclic epoxy compound according to claim 1 or claim 2,

in which the concentration of reactive intermediate compounds represented by the following general formula (III):



(III)

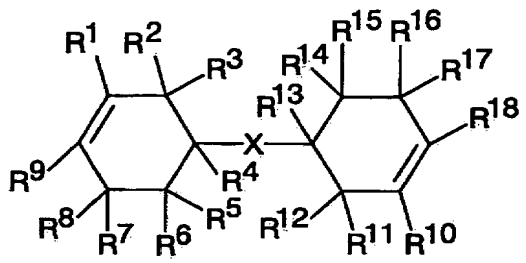
(wherein X is a divalent group selected from the group consisting of an oxygen atom, a sulfur atom, -SO-, $-SO_2-$, $-CH_2-$, $-C(CH_3)_2-$, $-CBr_2-$, $-C(CBr_3)_2-$, and $-C(CF_3)_2-$; R^1 to R^{18} each may be identical or different from each other and are a hydrogen atom, a halogen atom, a hydrocarbon group that may contain an oxygen atom or halogen atom, or an alkoxy group that may have a substituent),

in detection by gas chromatography is 4.5% or less with respect to the sum total of all of detected peak areas in terms of the peak area ratio per retention time.

4. The high-purity alicyclic epoxy compound according to any of claims 1 to 3, wherein a color hue (APHA) is 60 or less.

5. The high-purity alicyclic epoxy compound according to

any one of claims 1 to 4, wherein the alicyclic epoxy compound is produced by epoxidizing, with an aliphatic percarboxylic acid having substantially no water, an alicyclic olefin compound represented by the following general formula (II):



(II)

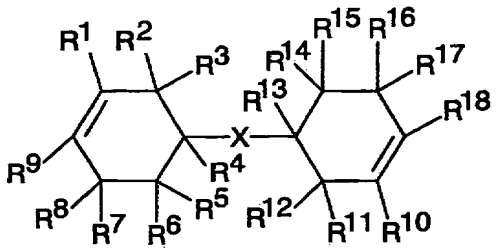
(wherein X is a divalent group selected from the group consisting of an oxygen atom, a sulfur atom, -SO-, $-SO_2-$, $-CH_2-$, $-C(CH_3)_2-$, $-CBr_2-$, $-C(CBr_3)_2-$, and $-C(CF_3)_2-$; R^1 to R^{18} each may be identical or different from each other and are a hydrogen atom, a halogen atom, a hydrocarbon group that may contain an oxygen atom or halogen atom, or an alkoxy group that may have a substituent),

which is 95.0% or more with respect to the sum total of all of detected peak areas in terms of the peak area ratio determined by a gas chromatography.

6. The high-purity alicyclic epoxy compound according to claim 5, wherein the alicyclic epoxy compound is obtained by epoxidation followed by the removal of a solvent and purification by distillation.

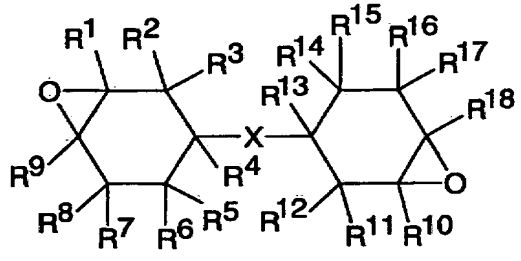
7. A process for the production of a high-purity alicyclic epoxy compound,

in which an alicyclic olefin compound represented by the following general formula (II)



(II)

is epoxidized with an aliphatic percarboxylic acid having substantially no water followed by the removal of a solvent to produce an alicyclic epoxy compound represented by the general formula (I)



(I)

(in the formulas (I) and (II), X is a divalent group selected from the group consisting of an oxygen atom, a sulfur atom, -SO-, $-SO_2-$, $-CH_2-$, $-C(CH_3)_2-$, $-CBr_2-$, $-C(CBr_3)_2-$, and $-C(CF_3)_2-$; R^1 to R^{18} each may be identical or different from each other and are a hydrogen atom, a halogen atom, a hydrocarbon group that may contain an oxygen atom or halogen atom, or an alkoxy group that may have a substituent),

that is in turn subjected to purification by distillation to thereby the high-purity alicyclic epoxy compound wherein the

concentration of high-molecular-weight components having an elution time shorter than that of the alicyclic epoxy compound in detection by GPC analysis is 5.5% or less with respect to the sum total of all of detected peak areas in terms of the peak area ratio per elution time.

8. The process for the production of a high-purity alicyclic epoxy compound according to claim 7,

in which the concentration of impurities having a retention time shorter than that of the alicyclic epoxy compound represented by the above general formula (I) in detection by gas chromatography is 19.5% or less with respect to the sum total of all of detected peak areas in terms of the peak area ratio per retention time.

9. The process for the production of a high-purity alicyclic epoxy compound according to claim 7 or claim 8,

the concentration of reactive intermediate compounds represented by the above general formula (III) in detection by gas chromatography is 4.5% or less with respect to the sum total of all of detected peak areas in terms of the peak area ratio per retention time.

10. The process for the production of a high-purity alicyclic epoxy compound according to any one of claims 7 ~~to 9,~~ wherein a color hue (APHA) is 60 or less.

11. The process for the production of a high-purity alicyclic epoxy compound according to any one of claims 7 to 10,

wherein the aliphatic percarboxylic acid is obtained by the oxidation of a corresponding aldehyde.

12. The process for the production of a high-purity alicyclic epoxy compound according to any one of claims 7 to 11, wherein a water content in the aliphatic percarboxylic acid is 0.8% by weight or less.

13. The process for the production of a high-purity alicyclic epoxy compound according to any one of claims 7 to 12, wherein the aliphatic percarboxylic acid is a peracetic acid.

14. The process for the production of a high-purity alicyclic epoxy compound according to any one of claims 7 to 13, wherein the purification by distillation is carried out at a heating temperature ranging of 100 to 350°C and at a pressure of 50 to 0.01 Torr.

15. The process for the production of a high-purity alicyclic epoxy compound according to any one of claims 8 to 14, wherein the aliphatic percarboxylic acid is an ethyl acetate solution.

16. A photo-curable and/or heat-curable epoxy resin composition comprising the epoxy compound according to any one of claims 1 to 7; an epoxy group-containing compound optionally added; and a curing agent or a curing catalyst.

17. A cured product that is obtained by curing the curable epoxy resin composition according to claim 16.

18. A transparent material for encapsulation made of the high-purity alicyclic epoxy compound according to any one of claims 1 to 7.

19. An adhesive made of the high-purity alicyclic epoxy compound according to any one of claims 1 to 7.

20. The cured product according to claim 18, wherein the cured product is at least one selected from a transparent film, transparent sheet, an insulating material between layers, a coated film, and a paint film.